

New Indications For ENPP1 Inhibitors

Tech ID: 30529 / UC Case 2019-500-0

SUMMARY

UCLA researchers in the Department of Medicine have developed small molecule ENPP1 inhibitors and monoclonal antibodies for treating myocardial infarction and ocular calcification.

BACKGROUND

Myocardial infarction (MI) is the irreversible death of heart muscle tissue due to prolonged lack of oxygen. A common cause of MI is atherosclerosis, or narrowing of a coronary artery due to the accumulation of fatty plaque. The buildup of plaque progresses slowly over time, and remains asymptomatic until an atheroma ulcerates, leading to immediate blood clotting and obstruction of blood flow. Treatment of MI using antiplatelet anticoagulant (i.e. aspirin) and/or P2Y12 inhibitors (i.e. clopidogrel) aims to unblock blood vessels, reduce the clot size, and prevent clot enlargement for future MIs.

Pseudoxanthoma elasticum (Groenblad syndrome) (PXE) is a hereditary disorder that causes mineralization and calcification in elastic fibers in the skin, eyes and blood vessels. It is an orphan disease that, in the eye, leads to retinal damage and blindness. PXE can occur in young and elderly individuals.

INNOVATION

Researchers at UCLA have observed that ectonucleotide pyrophosphatase/phosphodiesterase family member 1 (ENPP1) is highly expressed by cardiac fibroblasts in the myocardial injury site. During injury, ENPP1 is upregulated in these cardiac fibroblasts and leads to disrupted wound healing. The developed small molecule inhibitors and monoclonal antibodies targeting the catalytic domain of ENPP1 prevent this disruption and present new therapeutic strategies for the preservation of cardiac function after MI.

In addition, the monoclonal antibodies can be used to screen for PXE. UCLA researchers have identified drugs in clinical use that are not known to inhibit ENPP1 or prevent ectopic calcification. These commercially used FDA approved prescription drugs and the can decrease ectopic calcification, coupled with the use of ENPP1 inhibitors, can prevent calcification and blindness.

APPLICATIONS

- ▶ Treatment for myocardial infarction
- ▶ Treatment for Pseudoxanthoma elasticum (Groenblad syndrome) (PXE) associated retinal damage and blindness

ADVANTAGES

- ▶ Preservation of cardiac function
- ▶ Prevention of mineralization and calcification in eyes due to PXE

STATE OF DEVELOPMENT

The invention is currently at pre-clinical stage.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	2022-007990	03/17/2022	2019-500

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OTHER INFORMATION

KEYWORDS

myocardial infarction, small molecule inhibitor, ENPP1, atherosclerosis

CATEGORIZED AS

- ▶ **Medical**
 - ▶ Disease: Cardiovascular and Circulatory System
 - ▶ New Chemical Entities, Drug Leads
 - ▶ Therapeutics
- ▶ **Research Tools**
 - ▶ Antibodies
 - ▶ Reagents

RELATED CASES

2019-500-0, 2019-525-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Wnt1 for the Treatment of Peripheral Vascular Disease and the Repair of Heart](#)
- ▶ [Small Molecule Inhibitors of Cardiovascular and Renal Ectopic Calcification](#)
- ▶ [New Indications For ENPP1 Inhibitors, Part Two](#)

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